

PHILIP W. TOWLE
Air Pollution Control Officer

DONNA M. ROBERTS
Administrative Aide



306 East Gobbi Street
Ukiah, California

(707) 463-4354
Fax: (707) 463-5707

COUNTY OF MENDOCINO
AIR QUALITY MANAGEMENT DISTRICT
UKIAH, CALIFORNIA 95482

Facsimile Transmittal Sheet

Date: 12/22/99
Total pages: 9
To: NAHID ZOUHRI
Company: ERA Region 9
Phone: 415-744-1261
Fax: 415-744-1076
From: DEAN WOLRACH
Phone: 707-463-4354
Fax: 707-463-5707
E-Mail: mcaqmd@co.mendocino.ca.us

Comments: Here is THE LAST INFORMATION ON

GPW R BRCC Boiler #3 (65) All CONDITIONS

ARE INCORPORATED IN CURRENT DISTRICT PERMIT.

WE DO NOT HAVE A CLEAN COMPLETE COPY

Also THIS ACTUALLY WAS AN NSR, NOT A PSD!



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

215 Fremont Street
San Francisco, Ca. 94105IN REPLY E-4-2
REFER TO: NSR 4-4-1
NC 79-07**RECEIVED**
NOV 9 1981MEMORANDUM FOR
AIR POLLUTION
CONTROL DISTRICTMr. Keith M. Bentley
Senior Environmental Engineer
Georgia-Pacific Corporation
2310 Parklake Drive, NE
P.O. Box 105041
Atlanta, GA 30348

NOV 6 1981

Dear Mr. Bentley:

*Final - Authority - Amends
11-5-80*

This is in response to your letter, dated October 23, 1981, requesting an amendment to Georgia Pacific Corporation's November 5, 1980 Approval to Construct (NSR 4-4-1: NC 79-07) for the construction of #5 Hog fuel boiler at their facility in Fort Bragg, California.

The amendment, as requested, is to raise the permitted particulate emission rate for the #5 boiler from 0.03 gr/dscf to 0.05 gr/dscf. Contemporaneous with the startup of the new boiler Georgia-Pacific Corporation proposes to take out of service existing #3 and #4 Dutch ovens.

EPA has reviewed the impact of the proposed changes and determined that they would result in a total net decrease of 7 tons/year of particulate matter emissions at the plant. Based on this analysis, EPA has determined to amend the permit as requested. To ensure the "federal enforceability" of the proposed offsets, the permit amendments include conditions requiring the existing #3 and #4 Dutch ovens to be retired.

EPA hereby amends Georgia-Pacific Corporation's November 5, 1980 Approval to Construct (NSR 4-4-1: NC 79-07) as follows:

- 1) Special condition VIII B. Particulate Control Technology is changed to read as follows:

-2-

B. Particulate Control Technology

1. Georgia-Pacific shall install a wet scrubber capable of meeting the limit specified in Special Condition D on the equipment designated below, prior to startup of such equipment:

#5 Hog fuel boiler

Exhaust gases from the above boiler shall be ducted through the wet scrubber at all times during its operation.

2. Georgia-Pacific Corporation shall record, once daily in a permanent record, the wet scrubber flange to flange operating pressure drop. This record shall be available for periodic inspection by the Mendocino County Air Pollution Control District, the California Air Resources Board and the EPA.

- 2) Special Condition VIII D. Emission Limits for Particulate Matter is changed to read as follows:

D. Emission Limits for Particulate Matter

On and after the date of startup, Georgia-Pacific Corporation shall not discharge into the atmosphere particulate matter in excess of:

1. 0.05 gr/dscf @ 12% CO₂ (2-hour average) from the proposed #5 boiler.
2. 21.0 pounds/hour (2-hour average) @ 98,000 ± 5,000 pounds steam/hour operating rate.

- 3) Special Condition VIII G. Shutdown of #3 and #4 Dutch ovens is added as follows:

G. Shutdown of #3 and #4 Dutch ovens

On and after the date of startup of the #5 Hog fuel boiler, Georgia-Pacific Corporation shall no longer operate #3 and #4 Dutch ovens. EPA shall be notified in writing of the date #3 and #4 Dutch ovens are shut down. Such notification shall be made no later than thirty days from the date of shutdown.

-3-

All other conditions contained within Georgia-Pacific Corporation's November 5, 1980 Approval to Construct shall remain unchanged.

If you have any questions regarding this matter, please contact David Solomon of our Permits Branch at (415)974-8066

Sincerely yours,

Original Signed by:

Carl C. Kohnert, Jr.
Acting Director
Enforcement Division

cc: Mendocino County APCD ✓
California Air Resources Board

November 4, 1991

Keith Bentley, Sr. Env. Eng.
Georgia-Pacific Corporation
2310 Parklake Drive, N.E.
P O Box 195041
Atlanta, Georgia 30348

In our discussions of October 20, 1991, and in your letter of October 26, 1991, Georgia-Pacific has now requested the modification of the Permit Limits for the proposed new woodwaste-fired boiler for the Fort Bragg, California, Mill operations designated as #5.

Your following letter of October 23, included a history of the events taking place by District and EPA on your application. This history does not reflect that the District's original permit condition approval letter of May 16, 1979, included, as a particulate emission limitation, the same emission limitation Georgia-Pacific is now requesting, 0.05 gr/scfd. The District also published an announcement to that effect on May 17, 1979, on the project of its intent to approve the project.

EPA as the final source approval agent per CAM/SIP requirements, as you explained in your history, initially modified and remodified, their stance for the many and varied reasons you have explained. Final decision of the latest requirements by EPA is yet to come.

The District was initially and is presently content with the net reduction in particulate that will be brought about by the shutdown of the Dutch oven boilers in conjunction with the control requirements as they initially stood. The emission increases of all other pollutants save the NOx (better than 50% by estimation) will still be insignificant for the areas as this is the only major contributor there.

The District is therefore modifying the Conditions of Approval outlined in January, 1991, reflecting a change from 0.03 to 0.05 gr/scfd in Special Condition II (B).

Keith Bentley
page 2-

We are attaching the modified Special Conditions for the Authority to Construct approval on the new boiler #5.

If there are any questions, please contact us.

Sincerely,

Robert F. Swan
Deputy Director Air Pollution Control

RFS:smh

cc: Ralph Shoulders, Ft. Bragg
David Solomon, EPA
Charles Sassenrath

Attachments

ATTACHMENT

FINAL
MODIFIED
CONDITIONS

PERMIT CONDITIONS

- A. Notification of start-up shall be made in writing at least 10 days prior to the date of anticipated initial start-up of the #5 wood-fired boiler.
- B. Equipment, facilities, and systems installed to achieve compliance with the terms and conditions of this Authority to Construct shall at all times be maintained in good working order and be operated as efficiently as possible so as to minimize air pollutant emissions.
- C. The Mendocino County Air Pollution Control District shall be notified in accordance with the provisions of Rule 540 of Regulation I of the California North Coast Air Basin Regulations, in the event of any failure of air pollution control equipment, or other equipment which results in an increase in the allowable emissions stated in (II A).
- D. In the event of changes in control or ownership of the facilities to be constructed, the terms of this Authority to Construct shall be binding on all subsequent owners and operators.

II. SPECIAL CONDITIONS

A. Particulate Control Device

1. Georgia-Pacific Corporation shall install a control device capable of meeting the limit specified in Condition B, following, for the new #5 boiler.
2. The exhaust gases therefrom, shall be ducted through the control device at all times during its operation.

P.08/09
NO_x - 0.2 lb/Hr
H₂O -

B. Emission Limitations

On or after the date of start-up, Georgia-Pacific Corporation shall not discharge into the atmosphere particulate matter in excess of 0.75 gr/scfd @ 12% CO₂ (2 hour average) from the proposed #5 boiler.

C. Fuel Limitations

A permanent record shall be kept for the #5 boiler that includes:

1. Amount of fuel oil burned each day;
2. Length of time fuel oil is burned;
3. Sulfur content of all fuel oils received.

This record shall be available for periodic inspection by the Mendocino County Air Pollution Control District.

D. Performance Tests

1. Within 60 days after achieving the maximum production rate of the proposed facility, but not later than 180 days after initial start-up, and at such other times as specified by the Mendocino County Air Pollution Control District, Georgia-Pacific Corporation shall conduct performance tests for particulate matter, and furnish the Mendocino County Air Pollution Control District a written report of the results of such tests. The tests for particulate matter shall be conducted at a steam production rate of $98,000 \pm 5,000$ lbs/hour and another at the maximum operating capacity of the facilities being tested.
2. Performance tests for particulate matter emissions shall be conducted and results reported in accordance with the methods set forth in 40 CFR, Parts 60.8 and 60.46 of the Standards of Performance for New Sources on the equipment named in the

II. SPECIAL CONDITIONS (continued)

foregoing sections. The Mendocino County Air Pollution Control District shall be notified in writing at least 10 days in advance of such tests.

D. Boilers #3 and #4 shall cease operation within 90 days of start-up of boiler #5. Written notification shall be made to the Mendocino County Air Pollution Control District that the operation has been discontinued.

F. Any cinders or fly-ash collected from boiler #5 shall be re-injected and burned in the #5 boiler, or will be re-injected and burned in another boiler with secondary collection facilities, or will be deposited at an approved landfill site.

PHILIP W. TOWLE
Air Pollution Control Officer

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COUNTY OF MENDOCINO
AIR QUALITY MANAGEMENT DISTRICT
UKIAH, CALIFORNIA 95482

Facsimile Transmittal Sheet

wants a
good example

Date: 8/31/99
Total pages: 5
To: NAHID ZOUESHTIAGH
Company: EPA Region 9
Phone: 415-744-1261
Fax: 415-744-1076
From: Dean Wolbaek
Phone: 707-463-4354
Fax: 707-463-5707
E-Mail: mcaqmd@co.mendocino.ca.us

Comments: HERE IS THE PRESENTATION OF
THE PERMIT CONDITIONS FOR 1 PIECE OF
EQUIPMENT AT A FACILITY. IS THIS
THE CORRECT WAY TO DO THE
"AUTHORITIES" ?

C. Equipment Item No. 41 – Boiler No. 3

1. Basic Equipment

Source: Wood waste stoker steam boiler with cinder reinjection
 Make: Riley Stoker
 Model: SAM 150
 Serial No:
 Power source: Wood bark, back-up oil
 Design Rate: 270MMBtu/hr (wood bark rating)
 Burner design: Stoker, traveling grate
 Comments: 20,000 lbs/hr rated steam capacity using hog fuel wood waste as fuel. Nominal flue gas characteristics: 144F, 76,300 SCFM, 59,000 DSCFM, 22.7% H₂O, 10.4% CO₂

2. Control Equipment

Flyash reinjection, multiclones, and wet scrubber (E41)

3. Monitoring Equipment

Steam production rates

4. Emissions Limitations

a. Particulate Matter

i. Particulate loading

PERMITTEE shall not cause to be discharged particulate matter into the atmosphere in excess of 0.05 grains per dry standard cubic foot corrected to 12% CO₂ determined by EPA Method 5. The particulate standard applies at all times except for periods of start-up, shutdown, and malfunction.

[Auth. §IV(C)(4)(a)(i): Federal 40 CFR 60.43b(c)(1), MCAQMD Permit No. 0120-1-20-82-01-1]

ii. Particulate loading {District only}

PERMITTEE shall not cause to be discharged particulate matter into the atmosphere in excess of 0.1 grains per standard cubic foot corrected to 12% CO₂ determined by CARB Method 5. The particulate standard applies at all times except for periods of start-up, shutdown, and malfunction.

[Auth. §IV(C)(4)(a)(ii): MCAQMD Permit No. 0120-1-20-82-01-1]

iii. Particulate loading {District only}

PERMITTEE shall not cause to be discharged particulate matter into the atmosphere in excess of 21.0 lbs/hr (2 hour average) @ 98,000±5,000 pounds steam/hour operating rate.

[Auth. §IV(C)(4)(a)(iii): MCAQMD Permit No. 0120-1-20-82-01-1]

why not
streamline

more stringent

↑ is this ATC?

iv. Visible emissions –

PERMITTEE shall not cause to be exhibited greater than 20 percent opacity except for one 6-minute period per hour of not more than 27 percent opacity. The opacity standard applies at all times except for periods of start-up, shutdown, and malfunction.

[Auth. §IV(C)(4)(a)(iv): Federal 40 CFR 60.43b(f)]

v. Visible emissions {District Only}

The permittee shall not cause to be discharged into the atmosphere any gases that exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity. The opacity standard applies at all times except for periods of start-up, shutdown, and malfunction.

[Auth. §IV(C)(4)(a)(v): MCAQMD Regulation 1, rule 410(b)]

b. Carbon Monoxide - NA

c. Nitrogen Oxides – NA (Note: Limited by fuel use limits under §C7(b)(i) below.)

[Auth. §IV(C)(4)(c): Federal 40 CFR 60.44b(c)]

d. Hydrocarbons - NA

e. HAPs - NA

5. Compliance Monitoring

a. Particulate loading

Particulate loading shall be monitored using EPA Method 5 or other EPA approved method. The permittee shall be required to conduct performance testing for particulate material once per year. If the compliance test result is less than one-half the permitted standard, then the District may waive the next year compliance test.

b. Particulate loading {District only}

District only requirements for particulate loading shall be monitored using CARB Method. The permittee shall be required to conduct performance testing for particulate material once per year. If the compliance test result is less than one-half the permitted standard, then the District may waive the next year compliance test.

c. Visible emissions

EPA Method 9 or other EPA approved method. The permittee shall be required to conduct performance testing for visible emissions once per quarter.

d. Carbon monoxide

Carbon monoxide shall be monitored using EPA Method 10 or other EPA approved method. The permittee shall be required to conduct performance testing for carbon monoxide during each compliance test for particulate emissions. If the compliance test result is less than one-half the permitted standard, then the District may waive the next year compliance test. *basis*

e. Nitrogen Oxides

Nitrogen oxides shall be monitored using EPA Methods 7-7E or other EPA approved methods. The permittee shall be required to conduct performance testing for nitrogen oxides once per year. If the compliance test result is less than one-half the permitted standard, then the District may waive the next year compliance test. *basis*

6. Record Keeping and Reporting

a. Steam Production

PERMITTEE shall operate and maintain strip chart recorders or equivalent to record steam production rates.

[Auth § IV C 6a: MCAQMD Permit No. 0120-1-20-82-01-1] *ATC*

b. Wet scrubber pressure drop

PERMITTEE shall record once daily in a permanent record the wet scrubber flange to flange operating pressure drop. *syn or forever*

[Auth § IV C 6b: MCAQMD Permit No. 0120-1-20-82-01-1]

c. Fuel use

PERMITTEE shall maintain a permanent record of fuel usage that includes:

i. Wood waste fuel consumed, measured in bone dry tons. *→ daily? weekly, ...?*

ii. Fuel oil consumed in U.S. gallons. *"*

iii. Sulfur content of each lot of fuel purchased. *(certified by vendor - fuel spec?)*

[Auth § IV C 6c: MCAQMD Permit No. 0120-1-20-82-01-1]

d. Reporting

All records required under this permit shall be available for periodic inspection by the Mendocino Air Quality Management District, the California Air Resources Board, and/or the U.S. Environmental Protection Agency. *} 5 years*

[Auth § IV C 6d: MCAQMD Permit No. 0120-1-20-82-01-1]

Record keeping

7. Operating Conditions **{District Only}** *← why*

a. Steam Production Limits

- i. PERMITTEE shall not generate steam from the No. 3 Boiler in excess of 140,000 lbs/hr on a 24-hr average.
- ii. PERMITTEE shall not generate steam from the No. 3 Boiler in excess of 98,000 lbs/hr on an annual average.

b. Fuel Limitations

- i. PERMITTEE shall use only wood waste products (bark, chips, and sawdust) as primary fuel. Fuel oil may be used as a supplement for no more than 438 hrs/year.
- ii. Fuel oil sulfur content shall not exceed 1.75% on a daily average basis nor 1.55% on an annual average basis, as determined by ASTM Method D115-68 or D129-64

[Auth § IV C 7: MCAQMD Permit No. 0120-1-20-82-01-1]

A

R

D

SOURCE SAMPLING MANUAL VOLUME I

January, 1976

Revised: April, 1979

August, 1981; January, 1992

RECEIVED

JAN 06 2000

MENDOCINO COUNTY
AIR QUALITY
MANAGEMENT DIST.

State of Oregon
Department of Environmental Quality
Air Quality Division

SOURCE SAMPLING

MANUAL

VOLUME I

January, 1976

Revised

April, 1979

August, 1981

January, 1992

State of Oregon
Department of Environmental Quality
Air Quality Division

3.5.3 Oregon Method 8

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY

Source Sampling Method 8

Sampling Particulate Emissions From Stationary Sources
(High Volume Method)

1. Principle and Applicability
 - 1.1 Principle: Particulate matter is withdrawn isokinetically from a flowing gas stream and deposited on a glass fiber filter. The particulate matter is determined gravimetrically after removal of uncombined water.
 - 1.2 Applicability: This method is applicable to stationary sources whose primary emissions are solid particulate. It's primary application is intended to be wood product handling cyclone and baghouse exhaust systems. Prior approval of the Department is required before this method can be applied to other type of source emissions for the purpose of demonstrating compliance.
2. Acceptability
 - 2.1 Results from this method will be accepted as a demonstration of compliance (or non-compliance) provided that the methods included or referenced in this procedure are strictly adhered to and a report containing at least the minimum amount of information regarding the source is included. Deviations from the procedures described herein will be permitted only if permission from the Department is obtained in writing in advance of the tests.
3. Sampling Apparatus (Figure 8.1)
 - 3.1 Nozzle - smooth metal construction with sharp leading edge. The nozzle shall be connected to the probe by means of a joint designed to minimize particulate matter deposition.
 - 3.2 Probe - smooth metal construction. The probe shall be attached to the nozzle and filter holder with air tight joints designed to minimize particulate matter

deposition. The probe should be as short as possible.

- 3.3 Filter holder - air tight with support screen for the filter.
- 3.4 Metering system - a calibrated orifice followed by a thermometer or thermocouple and flow control device. The metering system shall be connected to the filter holder by means of an air tight joint.
- 3.5 Pitot tube - P type or S type or equivalent, calibrated as described in EPA Method 2 (40 CFR Part 60 Appendix A).
- 3.6 Blower - high capacity (typically 60 cfm free air). The blower may be connected to the metering system by a flexible hose if desired.
- 3.7 Probe Brush - flexible, nylon bristle brush at least as long as the probe and nozzle.
- 3.8 Differential Pressure Gauges - liquid manometer, Magnehelic², or equivalent. Differential pressure gauges other than liquid manometers shall be calibrated against a liquid manometer.
- 3.9 Barometer - mercury, aneroid, or other type capable of measuring atmospheric pressure to within 0.1 in Hg. If the barometric pressure is obtained from a nearby weather bureau station, the true station pressure (not corrected for elevation) must be obtained and an adjustment for elevation differences between the station and sampling site must be applied.
- 3.10 Temperature Gauges - as described in EPA Method 2.
- 3.11 Timer - integrating type, accurate and readable to the nearest 5 seconds per hour.
- 3.12 Filter Storage Container - clean manilla envelopes and tagboards or suitable equivalent.
- 3.13 Sample Storage Containers - glass with leak tight cap that is resistant to attack by the solvent used and allows complete recovery of particulate matter.

²Mention of trade names or specific products does not constitute endorsement of the Department of Environmental Quality

Polyethylene bottles are also acceptable.

4. Reagents

- 4.1 Filters - glass fiber filters, free of pinhole leaks or other imperfections and exhibiting at least 99.95% efficiency on 0.3 micron DOP smoke particles. Desiccate individually numbered filters for 24 hours and weigh to the nearest 0.5 mg before use.
- 4.2 Probe Wash Solvent - acetone, reagent grade with 0.001% (0.008 mg/ml) residue. For aluminum probes and nozzles, methanol may be substituted for acetone. The same purity is required.

5. Sample Train Preparation

- 5.1 All parts of the sampling train shall be cleaned and properly calibrated as directed in Section 10.
- 5.2 Place a filter in the filter holder with the coarse side facing the flow, being careful not to damage it. Be certain that the filter is positioned so that no air can be drawn around the filter.
- 5.3 Assemble the sample train with the appropriate nozzle and length of probe. Perform a leak check by plugging the nozzle, turning on the blower, and observing the deflection of the flow orifice pressure gauge. The acceptable leakage rate shall not exceed 5% of the expected sample flow rate.

6. Sample Collection

- 6.1 Use a pitot tube to roughly map the velocity distribution across the face of the exhaust opening or duct. Areas of zero or negative flow should also be indicated if present. At each point at which the velocity is measured, measure the flow in the direction giving maximum deflection of the pitot pressure gauge. Record the data on Form 3.
- 6.2 Select six or more points of outgoing (positive) flow from the points measured in section 6.1 to sample. The points shall be representative of the flow pattern and shall include the point of maximum velocity. If six points of positive flow cannot be obtained, use the maximum number possible. Do not choose any points closer than 2 inches to the exhaust duct wall.

- 6.3 Measure the exhaust temperature.
- 6.4 Determine the nozzle size required for isokinetic sampling. An estimate of the orifice temperature is required. For low temperature exhausts, the orifice temperature is usually very close to the exhaust temperature. For higher temperature exhausts, a trial run may be necessary to determine the expected orifice temperature.
- 6.5 Calculate the required orifice pressure drop for each chosen sampling point to obtain an isokinetic sample rate. With the probe out of the exhaust stream, turn on the blower and adjust the flow rate to that calculated for the first sampling point in section 6.2. Locate the probe nozzle at the first sampling point and immediately start the timer. Move the probe around until the velocity pressure matches that for which the sampling flow rate was pre-set. The probe nozzle must be pointing directly into the flow.
- 6.6 Continually monitor the velocity during the sampling period and move the probe around as required to keep it in an area where the velocity matches the original velocity used to calculate the pre-set sampling rate. Record the sampling time, the orifice temperature, and orifice pressure drop on the data sheet. Record data every 5 minutes or once per sampling point, whichever is more frequent. Sample for a length of time so that the total sampling time for all points is at least 15 minutes and a minimum of 100 mg of particulate matter is collected.
- 6.7 Repeat steps 6.5 and 6.6 for each sampling point. The blower need not be turned off between points if readjustment to the new sampling rate can be made rapidly (less than 15 seconds).
- 6.8 Care should be taken so that the nozzle does not touch the walls of the exhaust stack because particulate matter may be dislodged and enter the sample train. If there is reason to believe this has happened, discontinue the sample, clean the train, and restart the test.
- 6.9 If excessive loading of the filter should occur, or the pressure drop should increase such that isokinetic conditions cannot be maintained, replace the filter and continue the test.

- 6.10 At the conclusion of the sampling period, remove the probe from the exhaust and turn off the blower (do not reverse this order because the filter may be broken and sample lost). Plug the nozzle to prevent sample loss and transport to the sample recovery area.
 - 6.11 Conduct a post-test leak check (section 5.3).
 - 6.12 Measure the moisture content, molecular weight, and the barometric pressure (absolute) of the exhaust gas. In most cases, the moisture may be measured by the wet bulb/dry bulb technique as described in Oregon Source Sampling Method 4. The molecular weight shall be measured by EPA Method 3 or 3a. If ambient air is the gas being sampled, the molecular weight can be assumed to equal 29 lbs/lb mole (29 g/g mole).
7. Sample Recovery
- 7.1 Remove the nozzle plug, turn on the blower, insert the probe brush into the nozzle and brush the particulate from the nozzle and probe onto the filter. Do not insert the brush so far in that it will come into contact with the filter. Turn off the blower.
 - 7.2 Open the filter holder and carefully remove the filter. Inspect the filter for holes or tears or places where the samples are deposited up to the edge of the filter indicating a leak around the filter. If any are found, clean the train and repeat the run. Fold the filter once lengthwise with the dirty side in and place in a folded manilla tagboard, folded edge down. Fasten the outside edge of the tagboard with a paper clip and place in the manilla envelope.
 - 7.3 Rinse the inside front of the filter holder, the probe and the nozzle with acetone or methanol while brushing. Repeat the rinsing/brushing until all particulate is removed as evidenced by a lack of visible residue on the inside surfaces after evaporation of the acetone or methanol. Retain the acetone or methanol rinse and a blank sample of the acetone or methanol in labelled containers for laboratory analysis.
8. Analysis
- 8.1 Desiccate the filter for 24 hours at room temperature (70°F or less) and weigh to a constant weight to the nearest 0.5 mg.

NOTE: Make certain that any particulate that may have dislodged from the filter into the tagboard or envelope is returned to the filter before weighing.

NOTE: Since the relatively large filter and particulate catch may be hygroscopic, weigh immediately upon removal from the desiccator.

- 8.2 Blanks shall be run in the field before and after the complete source testing activity. A minimum of 2 blanks shall be collected for each source test. This is accomplished by inserting a pre-weighed filter into the filter holder, performing a leak check, removing the filter and treating it as a sample filter in accordance with section 7.2.
- 8.3 Quantitatively transfer the solvent rinse and blank solvent to tared beakers or evaporating dishes, evaporate at room temperature (70°F or less) and pressure, desiccate and weigh to a constant weight to the nearest 0.5 mg.
- 8.4 Record the data on Form 4.
9. Exhaust Gas Flow Rate Measurement
 - 9.1 Since the air flow pattern at the location of the sampling points may preclude an accurate flow rate measurement, a point upstream of the sampling point shall be selected for a velocity traverse. The flow rate at the velocity sampling point should accurately represent the flow rate to the atmosphere at the particulate sampling point (i.e., no air flows should be added to or removed from the system between the velocity and the particulate sampling points).
 - 9.2 Select a suitable velocity sampling location in accordance with EPA Method 1.
 - 9.3 Measure the gas velocity and flow rate in accordance with EPA Method 2.
10. Calibration
 - 10.1 The orifice flow meter shall be calibrated at least once a year using a primary standard or a device which has been calibrated against a primary standard. The calibration data and calibration curves for the orifice

and intermediate standard shall be included in the source test report along with documentation of the primary standard.

- 10.2 The pitot tube, differential pressure gauges, and thermometers or thermocouples shall be calibrated at least every six months. The calibration data and/or calibration curves shall be included in the source test report.
- 10.3 The calibration records shall include the date, place, and method of calibration.
11. Calculations
 - 11.1 Total particulate emissions from the system shall be calculated by multiplying the particulate concentration measured at the exhaust by the flow through the system.
 - 11.2 Particulate Concentration. The following calculations shall be conducted for each test run:
 - 11.2.1 Total Sample Weight: Calculate the total sample weight from laboratory results by adding the net weight gain of the filter sample(s), adjusted for a blank value, to the net weight of particulate matter collected in the acetone rinse, corrected for an acetone blank. If the acetone rinse represents more than one test run, the particulate mass should be pro-rated for each test run according to the relative net weights of particulate matter collected on the filters. Record the results on a laboratory form such as figure 8.2.
 - 11.2.2 Total Sample Gas Volume: Calculate the sample gas volume for each sample point by multiplying the duration of the sample in minutes, times the average sample flow rate (actual cubic feet per minute - acfm). Add the volume of all sample points to get the total sample gas volume for the test run.

Sample flow rates for each point shall be determined from the orifice calibration curve. Typically, the orifice calibration curve is generated for flows at standard temperature and pressure, using 68°F and

29.92 in. Hg. as standard conditions. In order to obtain actual flows through the orifice, it is necessary to correct the calibration curve flows for the orifice temperature and pressure.

$$q_a = q_s \times \frac{T_o}{528} \times \frac{29.92}{P_o}$$

where;

q_o = actual flow rate through the orifice, acfm

q_s = calibration flow rate through the orifice, scfm

T_o = orifice temperature, °F

P_o = orifice pressure, "Hg

11.2.3 Calculate the particulate concentration in gr/dscf by the following equation:

$$C_g = 0.0154 \times \frac{m_n}{V_{std}}$$

Where;

C_s = particulate concentration, gr/dscf

m_n = total particulate weight, mg.

V_{std} = total sample volume, dscf.

= $q_s \times (1 - Bws) \times t$

Bws = fraction moisture content in the

sampled gas

t = sample time, minutes

11.3 Total Exhaust Gas Flow Rate

Use EPA Method 2 calculations to determine the total exhaust gas flow rate using the data obtained from section 9. For some cyclones, the total flow may be adjusted to account for air purposely vented out the bottom of the cyclone.

11.4 Total Emissions

Calculate the total particulate emission rate (lb/hr) by the following equation, using Form 5:

$$E = 2.205E-6 \times \frac{m_n}{V_{std}} \times Q_{sd}$$

where;

2.205E-6 = conversion factor, lb/mg

Q_{sd} = Total Exhaust Gas Flow
Rate, dscf/hr

11.5 Percent Isokinetic

Use the tabular computing equations in Form 5 to compute the percent isokinetic (I), defined as the ratio of the average velocity of the sample gas entering the sample nozzle to the average local velocity at the sampling points. In order to achieve acceptable results, the value of this parameter must be between 82 and 120%. Test results falling outside this range shall be discarded and the test repeated.

12. Test Reports

The test report shall include as a minimum the information requested in section 2.5.1 of this manual.

Figure 8.1

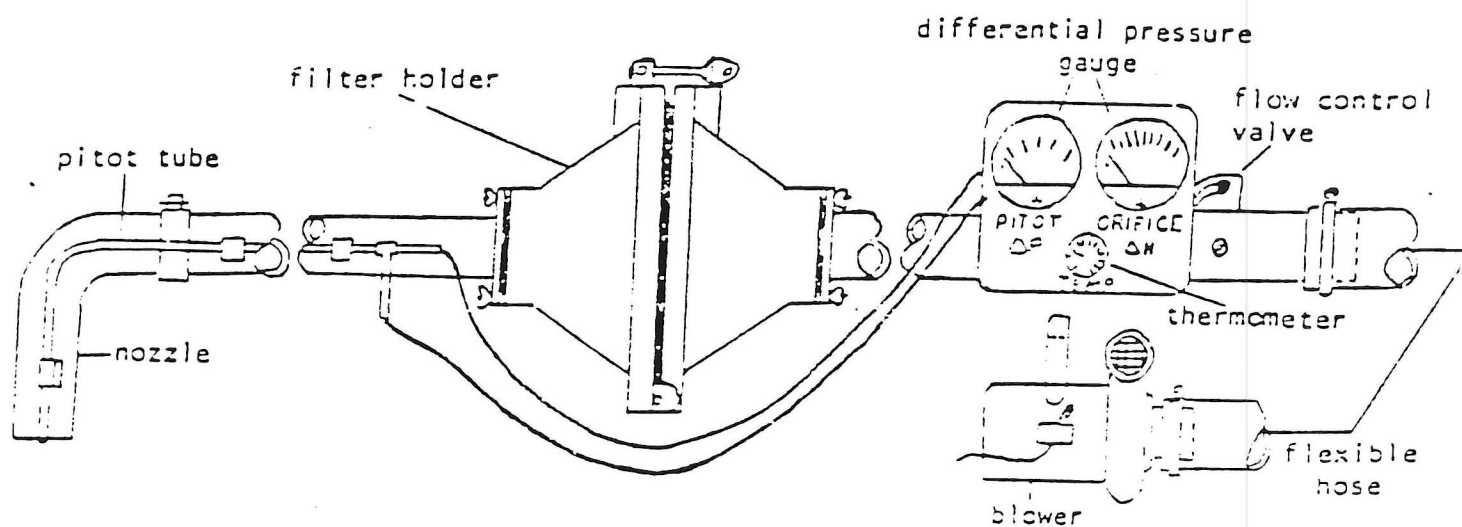


FIGURE 8.1 Typical Hi-Vol Particulate Sampling Train

Figure 8.2 - page 1

METHOD 8 DATA ANALYSIS FORM

Plant _____ Run Number _____
Sample Location _____ Test Date _____
Sample Recovered by _____

	Date/Time	Weight(g)	Audit*	T-°F	RH-%	By
<u>Filter</u>						
Filter ID _____						
Tare Wt. _____						
Date/time into dessicator _____						
<u>Acetone</u>						
Beaker ID _____						
Tare Wt. _____						
Solv. Vol. _____						
Solv. ID _____						
Date/time into dessicator _____						

* 0.5000 g ± tolerance - NIST traceable Class S weight

METHOD 8 BLANK ANALYSIS DATA FORM

Samples Prepared by _____ Date _____

Front Half:	Date/Time	Weight(g)	Audit*	T-°F	RH-%	By
<u>Filter</u>						
Filter ID _____						
Tare Wt. _____						
<u>Acetone</u>						
Beaker ID _____						
Tare Wt. _____						
Solv. Vol. _____						
Solv. ID _____						

* 0.5000 g ± tolerance - NIST traceable Class S weight

Figure 8.2 - Page 2

METHOD 8 TARE WEIGHT RECORD

Indicate: filters or evaporation containers (beakers)

[illegible]

EXHAUST GAS FLOW RATE DATA

Plant Name and Location _____
 Sampling Location or Identification _____ Time _____ By (name) _____
 Volume Measurement: Date _____
 Duct I.D. _____ in; Area (A) _____ ft²; No. of traverse points _____; Pitot calib. factor (C_p) _____
 Temperature: Dry Bulb _____ °F; Wet bulb _____ °F; Ambient _____ °F; %CO₂ _____; %O₂ _____
 Static Pressure _____ in. H₂O; Barometric Pressure (P_b) _____; Moisture _____

Sketch the sampling location showing the distance from disturbances and the numbered travers points:

Point No.	% Dia.	Distance from inside wall, in.	ΔP ₁ in.	√ΔP ₁ in.	ΔP ₂ in.	√ΔP ₂ in.	comments
1							
2							
3							
4							
5							T _s avg. = °R
6							ΔP avg. = in. H ₂ O
7							M _d = (.44 x %CO ₂) + (.32 x %O ₂) + (.28 x [100 - %O ₂ - %CO ₂])
8							= lb/lb mole
9							
10							Pitot tube leak check:
11							Initial:
12							Final:

VELOCITY PRE-SURVEY

Plant Name and Location _____

Date _____ Time _____ By (name) _____

Source Location or Identification _____

☐ Low Pressure System ☐ High Pressure System

Type of Exhaust:

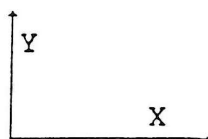
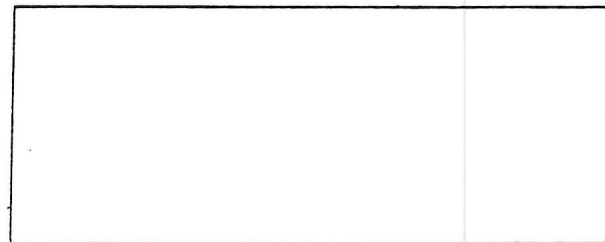
☐ Straight Vertical ☐ China Hat

☐ Goose-neck ☐ Other (specify) _____

Temperature: Dry Bulb _____ °F Wet Bulb _____ °F

Velocity Survey: Record velocity head at enough points to roughly map the velocity distribution across the exhaust cross-section. Select six points for sample collection and show in diagram.

Point	X inches	Y inches	ΔP in. H ₂ O	Check if selected ()
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
avg.				



EMISSION CALCULATION AND SUMMARY

Plant Name and Location _____

Date _____ By (name) _____

Exhaust Gas Flow Rate Calculations:						
ΔP	average velocity pressure, "H ₂ O	Form 1				
T _s	average stack gas temperature, °R	Form 1				
P _b	barometric pressure, "Hg	Form 1				
P _g	stack static pressure, "H ₂ O	Form 1				
P _s	stack absolute pressure, "Hg	$P_g/13.6 + P_b$				
B _{ws}	water vapor in the gas stream, proportion by volume	%H ₂ O/100, Form 1				
M _d	Molecular weight of stack gas, dry basis, lb/lb mole	$(0.44 \times \%CO_2) + (0.32 \times \%O_2) + 0.28 \times (100 - \%CO_2 - \%O_2)$				
M _s	molecular weight of stack gas, wet basis, lb/lb mole	$M_d \times (1 - B_{ws}) + 18 \times B_{ws}$				
K _p	Pitot tube constant	85.49				
V _s	Average stack gas velocity, ft/sec	$K_p \times C_p \times \sqrt{(\Delta P \times T_s) / (M_s \times P_s)}$				
A	Cross sectional area of stack, ft ²	Form 1				
Q _{sd}	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr	$V_s \times (1 - B_{ws}) \times A \times 528/T_s \times P_s/29.92$				

EMISSION CALCULATION AND SUMMARY

Plan Name and Location _____

Date _____ By (name) _____

Sample Point Gas Velocity Calculations:						
ΔP	average velocity press. at sample point, "H ₂ O	Form 3				
T _s	average stack gas temp. at sample point, °R	Form 3				
P _b	barometric press., "Hg	Form 3				
P _g	stack static press. at sample point, "H ₂ O	Form 3				
P _s	stack absolute pressure, "Hg	$P_g/13.6 + P_b$				
B _{ws}	water vapor in the gas stream at the sample point, proportion by volume	%H ₂ O/100, Form 3				
M _d	Molecular weight of stack gas at sample point, dry basis, lb/lb mole	$(0.44 \times \%CO_2) +$ $(0.32 \times \%O_2) + 0.28 \times$ $(100 - \%O_2 - \%CO_2),$ Form 3				
M _s	molecular weight of stack gas at sample point, wet basis, lb/lb mole	$M_d \times (1 - B_{ws})$ $+ 18 \times B_{ws}$				
K _p	Pitot tube constant	85.49				
V _s	Average stack gas velocity, ft/sec	$K_p \times C_p \times \sqrt{(\Delta P \times$ $T_s) / (M_s \times P_s)}$				

EMISSION CALCULATION AND SUMMARY

Plant Name and Location _____

Date _____ By (name) _____

Particulate emissions and sampling isokinetic calculations:						
q_0	avg. sample rate, acfm	Form 3				
t	total sample time, min.	Form 3				
V_0	Sample volume @ orifice temperature, acf	$q_0 \times t$				
T_0	avg. orifice temp., °R	Form 3				
B_{ws}	water vapor in the gas stream at the sample point, proportion by volume	%H ₂ O/100, Form 3				
V_{std}	Sample volume corrected to standard conditions, scf	$V_0 \times (1 - B_{ws}) \times 528/T_0 \times P_b/29.92$				
m_n	mass of particulate matter collected, mg	Form 3				
C_s	Particulate concentration, gr/dscf	$0.0154 \times m_n/V_{std}$				
E	Particulate emission rate, lb/hr	$m_n/V_{std} \times 2.205E^{-6} \times Q_{sd}$				
A_n	Cross sectional area of the sampling nozzle, in ²	Form 3				
T_s	Avg. temp. of the exhaust gas at the sample point, °R	Form 3				
V_n	Velocity of sample gas through the nozzle, ft/min.	$q_0/A_n \times T_s/T_0 \times 144$				
V_s	Avg. exhaust gas velocity at the sample point, ft/min	Form 4, Page 2				
I	Percent isokinetic	$100 \times V_n/V_s$				